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# Grand Canyon Wildlife

## Lesson Plans

- Use with the **Grand Canyon Wildlife Research Expedition** module.
- Use with the **Grand Canyon Wildlife** worksheets.
- Appropriate for grades **5 to 8**.

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# The Big Idea (or Central Theme)

What is the overall concept that we would like students to understand after exploring this module?

## **Science as Inquiry**

- Different kinds of scientific questions suggest different kinds of scientific investigations.
- Scientific explanations emphasize evidence.

# Essential Questions

What questions will encourage student inquiry?

1. Why should scientists study Grand Canyon wildlife?
  2. Should scientists let “nature take its course?”
  3. What are the best ways for scientists to study Grand Canyon wildlife?

# Assessment

What evidence is there that students have achieved understanding of the Big Idea?

◆ **Performance Tasks / Projects**

1. Students will examine an owl pellet and write an explanation of the owl's diet based on evidence gathered.
2. Given an example of wildlife, students will generate a scientific question to investigate, and design an investigation to search for the answer.
3. Given a data set regarding an example of wildlife, students will create a graphic representation of the data.

◆ **Quizzes / Tests**

None

◆ **Prompts**

1. Students will write a press release announcing the Grand Canyon river expedition described on the CD. What is the purpose of the expedition? Who are the members of the expedition? How is the expedition funded? Include at least one quote from a member of the expedition.

◆ **Observation Data**

1. Observation data will be collected during class discussions and during work on the performance tasks and projects.

◆ **Self-assessments**

1. Students will self-assess their performance tasks, projects, and prompts.

# Planning Lessons

Lessons should take teachers and students step-by-step through the modules. There will be several lessons per module.

**Lesson One: Life**

**Lesson Two: Purpose and Logistics**

**Lesson Three: Research**

# Life

## Objectives

Students Will Be Able To describe how scientists gather information about plants and animals that lived in the Grand Canyon area in years past.

SWBAT explain why scientific explanations rely on scientific evidence.

SWBAT write a scientific explanation based on evidence.

## Inquiry Question

How do scientists know what plants and animals lived before human records?

## Materials

- ◆ *Views of the National Parks* CD
- ◆ Owl Pellets
  - Possible source: Genesis, Inc.  
[www.pellet.com](http://www.pellet.com)  
1-800-4PELLET
- ◆ Dissecting Tools (toothpicks, tweezers, etc.)
- ◆ Construction paper
- ◆ [Owl Pellet Lab Worksheet](#)

**Procedure (Part One)**

1. If students have not had a chance to explore the *Views* CD, allow them some time to explore on their own or in small groups.
2. After students have looked at the disc in general, ask them to find and explore the **Grand Canyon Wildlife Module**.  
(At the Visitor Center, click on “Virtual Experiences,” then on the “Grand Canyon Wildlife” button). Encourage students to watch the short movie.
3. In small groups, ask students to define a “packrat,” in whatever context they are familiar with the word. Share definitions.
4. Introduce vocabulary: geologic, biological, abode, paleoecologist.

**Procedure (Part Two)**

1. Individually or in small groups, read the pages titled “Since the Pleistocene” in the “Life” section of the Grand Canyon module.
2. Ask:
  - How are scientists able to determine what kinds of plants and animals lived in the Grand Canyon area so long ago?
  - What evidence are their explanations based on?
  - Why are some people called packrats?
  - What is a midden? Amberat?
3. Ask students to brainstorm in pairs or small groups answers to the Discussion Questions posed on the [Owl Pellet Lab Worksheet](#). Share answers.
4. Ask students to predict what kinds of things an owl might eat. They should write their predictions on their worksheets.
5. Explain what owl pellets are, and distribute the pellets to small groups.
6. Review safety procedures, including the need to wash hands after the investigation.
7. Ask groups to examine their pellets to look for evidence of what the owl may have eaten. Use the construction paper as a workspace. Students should record their observations on the worksheet.
8. Ask students to write explanations of their observations, including supporting evidence. This can be done individually or in small groups, and should be modeled first.
9. Discuss students’ findings. Ask:
  - How was examining the owl pellets similar to what you read about the packrats on the CD? How was it different?
  - What does it mean to say that, “Scientific explanations emphasize evidence?”
  - What are some other ways scientists might collect evidence about animal behavior?

# Lesson Nine

## Key Vocabulary

- ◆ geologic
- ◆ biological
- ◆ abode
- ◆ paleoecologist
- ◆ midden
- ◆ amberat

## Discussion Questions

1. How are scientists able to determine what kinds of plants and animals lived in the Grand Canyon area so long ago?
2. What evidence are their explanations based on?
3. Why are some people called packrats?
4. How was examining the owl pellets similar to what you read about the packrats on the CD? How was it different?
5. What does it mean to say that, "Scientific explanations emphasize evidence?"
6. What are some other ways scientists might collect evidence about animal behavior?

**Assessment**

Students Will Be Assessed On ...

1. Discussion participation.
2. Completed lab worksheet.

**Differentiation**

To best meet all students' needs, we suggest ...

1. Heterogeneous grouping for the owl pellet investigation so that more advanced students can be of help to their teammates.
2. Providing sentence starters or fill in the blank sentences on the lab worksheet.

# Purpose and Logistics

## Objectives

Students Will Be Able To describe the purpose and logistics of the Grand Canyon research expedition illustrated in the Views program.

SWBAT compare and contrast historical and modern-day expeditions.

## Inquiry Questions

1. Should scientists take steps to preserve species of plants and animals? Why or why not?
2. What preparations must be made for a scientific research expedition down the Colorado River?

## Materials

- ◆ *Views of the National Parks* CD
- ◆ Examples of press releases
- ◆ [Logistics Graphic Organizer](#)
- ◆ [Research Expedition Venn Diagram](#)



### Procedure (Part One)

1. Ask: "Why might scientists embark on a research expedition through the Grand Canyon? What questions might they be looking to answer?"
2. In pairs or small groups, have students read the information on the "**Purpose**" page of the Grand Canyon module.
3. Ask each small group to write a one-sentence summary of the purpose of the expedition.
4. Together, write a class summary of the purpose, incorporating ideas and phrases from the small group summaries.

### Procedure (Part Two)

1. Discuss the meaning of the word "Logistics."
2. In pairs or small groups, have students explore the "**Logistics**" pages of the Grand Canyon module, completing the [Logistics Graphic Organizer](#) as they explore. Students should write "Planning, Logistics, Funding, and People" on the four diagonal lines, and details from each section on the smaller horizontal lines.
3. Discuss the purpose of a press release. Give groups examples to look at, or put examples on overheads for the class to consider together. Ask students what they notice about the format, language, etc. of the press releases.
4. As a group, write a press release announcing a recent event at your school or in your community.
5. Assignment: Students will write a press release announcing the Grand Canyon river expedition described on the CD. What is the purpose of the expedition? Who are the members of the expedition? How is the expedition funded? Include at least one quote from a member of the expedition.

### Procedure (Part Three)

Within the Logistics section of the Grand Canyon module are four "buttons." The third button is also called "**Logistics**." Ask students to explore the information in this part of the program. Students should specifically look at the table on the third page of this section, which compares the logistics of this expedition to previous trips made by Lewis and Clark and Major Powell.

1. Ask: Why do you think different supplies were brought on the three expeditions? What was the purpose of Lewis and Clark's expedition? Major Powell's? How does the purpose of the expedition affect the supplies needed?
2. If students are not familiar with the format of a Venn Diagram, do a sample together, comparing and contrasting things familiar to the students, such as two books recently read.
3. Ask students to complete the [Logistics Venn Diagram](#) using the information in the table.

**Key Vocabulary**

- ◆ Invasive species
- ◆ Preservation
- ◆ Inventory
- ◆ Monitoring
- ◆ Expedition
- ◆ Logistics
- ◆ Navigation

**Discussion Questions**

1. Why might scientists embark on a research expedition through the Grand Canyon?
2. What questions might they be looking to answer?
3. What is a press release? How is it used?
4. What do the example press releases have in common?
5. What do you notice about the language used? The format?
6. Why do you think the different supplies were brought on the three expeditions?
7. What was the purpose of Lewis and Clark's expedition? Major Powell's?
8. How does the purpose of the expedition affect the supplies needed?



## Assessment

Students Will Be Assessed On ...

1. Written press release: Students will self-assess their press release, using the rubric provided. Self-assessments can be compared to teacher assessments.
2. Participation in group activities and discussions.
3. Completed Logistics Graphic Organizer.
4. Completed Research Expedition Venn Diagram.

## Differentiation

To best meet all students' needs, we suggest ...

1. Heterogeneous grouping for the completion of the graphic organizer so that more advanced students can be of help to their teammates.
2. Providing sentence starters or fill in the blank sentences on the graphic organizer, as well as for the press release.
3. Providing a word or sentence bank for the Venn Diagram.

# Research

## Objectives

Students Will Be Able To summarize the purpose, methods and results of the wildlife research expedition described on the CD.

SWBAT create an oral and visual presentation to share what they have learned about an example of wildlife.

Given an example of wildlife, SWABT generate a scientific question to investigate, and design an investigation to search for the answer.

## Inquiry Questions

1. What questions might scientists be trying to answer when they study the wildlife of the Grand Canyon?
2. What are the best ways for scientists to study Grand Canyon wildlife?
3. How does the purpose of an investigation affect the methods used?

## Materials

- ◆ *Views of the National Parks* CD
- ◆ [Grand Canyon Research Jigsaw Worksheet](#)
- ◆ [Research Plan Worksheet](#)
- ◆ [Peer Assessment Form](#)

### Procedure

Allow students some time to explore the **Research** section of the Views CD.

### Part One - Jigsaw

1. Divide the class into homogeneous groups or 3 or four students.
2. Assign each group one of the animals or groups of animals located on the "Research" page of the Grand Canyon module. (California Condor and Invasive Species do not work as well for this activity.)
3. Ask the groups to read the information in the "Field Notes" for their assigned animal or group, filling out the [Jigsaw Worksheet](#) as they explore.
4. Using the worksheet, groups should also plan how they will visually present information about their animal or group to their classmates. Examples might include a poster, a diorama, overheads, a power point presentation, or a picture book. Encourage students to brainstorm other ideas.
5. After groups have had time to prepare their presentations and visual aids (this may take several class periods) give each group an opportunity to present their information. Ask a few students to fill out the [Peer Assessment Form](#) for each group as they present.

### Part Two - Individual Project

1. As a class, review the different methods scientists use for studying wildlife. Discuss what would make a certain method appropriate for studying a certain animal or answering a particular question. For example, why were the peregrine falcons studied by stationing human observers in specific areas to make visual and auditory observations, while the bats were studied using a trap and release method? Was it because of differences in the animals being studied, differences in the purposes for the studies, or both?
2. Tell the class they are to imagine they are wildlife scientists who are embarking on a study of polar bears (or the animal of your choice.)
3. Brainstorm questions about polar bears that your group of "scientists" would like to collect data on. For example, what do polar bears eat? Do they eat the same things all year, or does their diet change with the seasons? Do polar bears migrate? Do polar bears live in groups? How much time do polar bears spend sleeping?
4. Choose one of the questions and brainstorm ways scientists could answer that question. What data could be collected? How might it be collected?
5. As a group, brainstorm animals that students might design a research plan about.
6. Assign the [Research Plan Worksheet](#).

**Key Vocabulary**

- ◆ Ecosystem
- ◆ Holistic

Vocabulary will vary depending which animal or group of animals students are reading about. Encourage students to discuss interesting or difficult words as they write them on their Jigsaw worksheets.

**Discussion Questions**

1. What information is it important for your classmates to learn about your animal or group?
2. What is the best way to share that information so that your classmates will learn it?
3. How does a scientist's purpose for research affect his or her methods of collecting data?
4. How does the animal being studied affect the methods used?
5. If you were a scientist, what would you want to learn about this animal?
6. How would you go about gathering information?
7. Why would you choose that method?

**Assessment**

Students Will Be Assessed On ...

1. Completed Jigsaw worksheets.
2. Group presentations, including peer assessments.
3. Participation in group activities and discussions.
4. Completed Research Plan worksheets.

**Differentiation**

To best meet all students' needs, we suggest ...

1. Heterogeneous grouping for the Jigsaw project.
2. Allowing choice in how information will be presented for the Jigsaw.
3. Providing sentence starters or fill in the blank sentences on the Jigsaw worksheet and/or the Research Plan worksheet.
4. Allowing a choice of animals for students to consider for the Research Plan worksheet.